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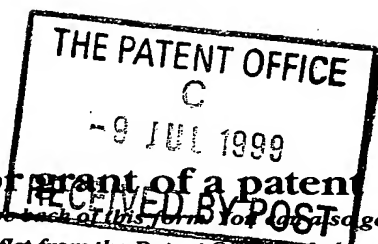
Signed

R. Mahoney

Dated

27 JUL 2000

09 JUL 99 E460710-1 053550
P01/7700 0.00 - 9916033.5



Request for grant of a patent
(See the notes on the back of this form for details and get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

CAP 3

2. Patent application number

(The Patent Office will fill in this part)

09 JUL 1999

9916033.5

3. Full name, address and postcode of the or of each applicant (underline all surnames)

BIOPROGRESS TECHNOLOGY INTERNATIONAL INC
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Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

A MULTIPLE DELIVERY CARTRIDGE

5. Name of your agent (if you have one)

foam 5177 7/1/00
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Keith W Nash & CO
90-92 Regent Street
CAMBRIDGE

CB2 1DP
Patents ADP number (if you know it)
120600.1

~~BIOPROGRESS TECHNOLOGY INTERNATIONAL INC
UNIT 1
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6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

A MULTIPLE DELIVERY CAPSULE

FIELD OF THE INVENTION

This invention relates to pharmaceutical encapsulation.

10 BACKGROUND TO THE INVENTION

15 The provision of pharmaceutical preparations in hard or soft gelatin capsules is well known. It is customary to encapsulate powdered preparations in two part hard capsules and liquids in soft gelatin capsules. The unique processing properties of gelatin has caused the development of an entire industry to service the pharmaceutical, dietary supplement and cosmetic industries. These capsules are designed to release their contents after ingestion and thus form a means of administering an accurate dose at the correct site in the body. They finished capsules offer protection to their contents yet solubility within the body. However because of the differences in powder and liquid handling, the processing means for the encapsulation of powders and liquids within a gelatin capsule are very distinct and remain incompatible. This situation renders impossible the provision of a capsule counting both powder and liquid. In addition, the dedicated manufacturing process for the manufacture of soft capsules is unable to incorporate a dividing septum within capsule which will enable the manufacture of a capsule containing two distinct liquid fills which will not mix until release in the body. This aspect is particularly relevant to certain multi component cold remedies which currently are unable to get FDA approval due to concerns of chemical reactions prior to ingestion. There is also a drug called Accutane which is an effective treatment for acne which can cause birth defects. In order to ensure that this does not happen birth control drugs must be taken. To ensure this process it would be far safer if the birth control means and the acne remedy were taken together but kept separate until after ingestion.

35 THE INVENTION

It is the shortcomings and limitations of current hard and soft capsules which this invention addresses.

40 Capsules described in this patent provide a delivery means with either at least two distinct liquid or powder fills, or a combination of liquid and powder. The materials can also be selected so as to exclude gelatin. The combination of materials used for the capsule wall and capsule dividing septum can be chosen to release either or both parts of the contents of capsule at specific sites within the body. These components can then address two different specific areas or act synergistically when mixed on release at the same site. In the latter example the capsule is serving to prevent the mixing of the two components prior to them reaching the correct site within the body as well as providing an accurate dose and blend of components for maximum efficacy.

Example 2. A dual delivery capsule as shown in figure 1 with one wall and dividing septum of like material, exemplified by hydroxy propyl methyl cellulose and the other wall of different material, exemplified by pectin.

Example 3. A dual delivery capsule as shown in figure 1 with walls and dividing septum of like material, exemplified by hydroxy propyl methyl cellulose with a coating on one half of the capsule and one side of the capsule dividing septum, exemplified by sodium alginate.

10 Example 4. A dual delivery capsule as shown in figure 1 with walls and dividing septum of like material, exemplified by hydroxy propyl methyl cellulose with the same coating on both sides of the capsule, exemplified by sodium alginate.

15 Example 5. A dual delivery capsule as shown in figure 1 with walls 3 and 1 of like material exemplified by hydroxy propyl methyl cellulose with different coatings on each exemplified by sodium alginate and gum arabic and dividing septum 2 coated on the side closest to the wall bearing the alginate coating with gum arabic.

20 Example 6. A dual delivery capsule as shown in figure 2 with a liquid fill contained within septum 2 and capsule wall 3 exemplified by dextromethorphan and a powder fill exemplified by chlorpheniramine contained between septum 2 and capsule wall 1.

25 Example 7. A dual delivery capsule as shown in figure 3 with two different liquid fills exemplified by cod liver oil and evening primrose oil contained between septum 2 and capsule wall 1 and capsule wall 3 respectively.

30

DIAGRAMS.

Figure 1 shows a dual delivery capsule with walls, 1 and 3 and dividing septum, 2.

35 Figure 2 shows a dual delivery capsule with a liquid fill contained between capsule wall 3 and septum, 2 and a powder fill between capsule wall 1 and septum , 2.

40 Figure 3 shows a dual delivery capsule with a liquid fill contained between capsule wall 3 and septum, 2 as well as between capsule wall 1 and septum , 2.

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Figure 1

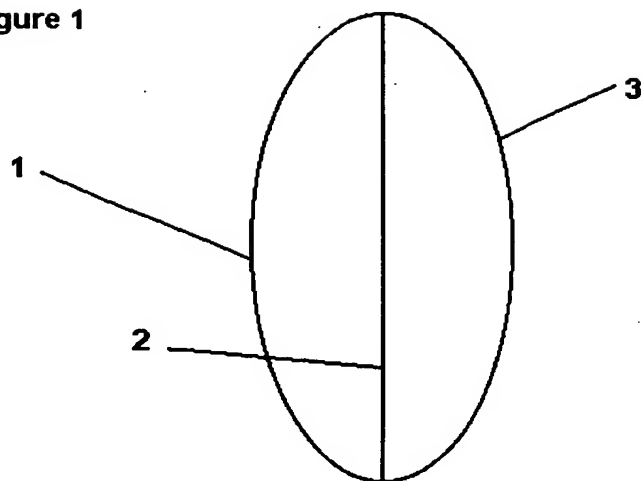


Figure 2

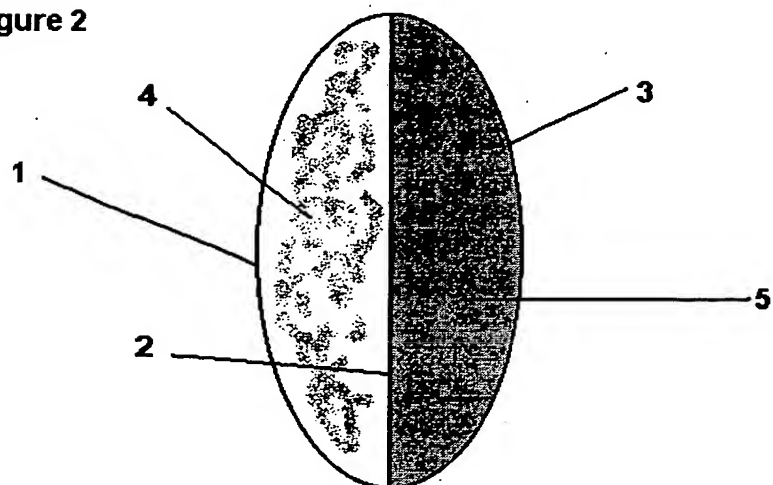


Figure 3

